

STORAGE

FAQ

Q What is BitTorrent, and how does it work?

A BitTorrent is a peer-to-peer file-sharing protocol used for distributing large amounts of data. Each recipient of a file supplies parts of the file to newer recipients, thereby using the power of each user's hardware and the bandwidth of their internet connection, rather than a single source being responsible for the cost of providing the file.

The more users that share a file, the faster it is for other users to download it. However, various BitTorrent clients will allow you to set how much of your internet connection is used for file sharing. Some clients will run on Windows, while others – mostly Linux-based – can run on dedicated hardware such as Emprex's P2P Download Engine (reviewed right). This means that you don't have to leave your computer on while a file downloads.

Alan Lu

PC systems and storage expert

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EMPREX P2P Download Engine

★★★★

£53 inc VAT

From www.scan.co.uk



As its name suggests, Emprex's P2P Download Engine is different from other network-attached storage (NAS) devices. The P2P doesn't have a built-in hard disk, so you have to add your own storage by plugging in a USB hard disk. Although any files stored on it are accessible from any computer on your network, the P2P's primary purpose is to download files using BitTorrent without the aid of a computer.

The P2P is tiny, measuring just 150x112x30mm. It connects to your router via an Ethernet cable and has two USB2 ports for connecting external disks. The ports provided enough power to our bus-powered 300GB portable disk. The setup utility and web configuration interface are straightforward to use, although it insists on reformatting any attached USB disk to FAT32 or ext2 (a Linux file system). The setup utility and manual recommends setting up DMZ or port forwarding on your router, to ensure your firewall doesn't slow down your BitTorrent downloads.

The web interface is also used to configure and start BitTorrent download tasks. A 350MB DivX file was downloaded over BitTorrent in 30 minutes, which is as we'd expect. There's no way to restrict access to just BitTorrent controls, though, which is problematic if you want to grant others on your network the ability to manage BitTorrent downloads.

The P2P can help reduce your bills if you download large files overnight. It uses 3W when idle and 4W when downloading files. This is far less than an average PC, which draws 80W when idle.

SUMMARY

- ✓ BitTorrent downloads without a PC
- ✓ Low power usage
- ✗ Poor security controls

NETWORK STORAGE ENCLOSURE 10/100 Ethernet network connection, 2x USB2 ports, BitTorrent, UPnP media, print server, FTP server
PART CODE NSD-100
DETAILS www.emprex.com

PERFORMANCE (see page 66)

Large files **2.4MB/s**
Small files **0.3MB/s**

-50% Reference +50% +100%

We were disappointed, but unsurprised, by the P2P's poor file-copying performance over our Ethernet network. Since the USB hard disk can be unplugged and connected directly to a computer, this isn't a crippling disadvantage, though.

If you choose to format the disk as FAT32, you won't be able to download and store files larger than 4GB. You could choose the ext2 format to get around this, but Windows wouldn't be able to recognise the file system without the help of a third-party utility. However, this problem is unlikely to affect most users.

Even with better file copying performance, the P2P still wouldn't be suitable as a file server for multiple users, due to its basic permissions controls. Each user can have their own folder, but it can only be made completely accessible to all other users, or not at all.

It can also act as an UPnP media server, so you can play downloaded music and videos on a network media player or PC. Standard definition DivX files played back

smoothly, although there was a slight pause when skipping back or forth to a different part of the video.

This is a cheap way to download files over BitTorrent without leaving your PC on constantly. It's not well suited for use by multiple users, however, due to its poor security controls. It's also too slow as a NAS. Synology's DiskStation DS-207+ (*What's New, Shopper* 241) is a much better choice if you need a NAS that has a built-in BitTorrent server.

Alan Lu

Also consider...

SANDISK Cruzer Contour 8GB

★★★★★

£37 inc VAT

From www.mymemory.co.uk

COMPUTER SHOPPER
BEST BUY

Sandisk's Cruzer Contour is one of the most stylish flash drives around. It takes a while to get used to its sliding design, but once mastered it's easy to open. The connector is hidden behind a door, which protects it from dust. This drive was fast in all our tests, and was particularly quick when writing small files. It's a U3 drive, so it comes preloaded with many useful applications, which run directly from the drive and leave no trace on the computer you're using.

The Cruzer Contour is stylish and quick, and wins a Best Buy award.



USB FLASH DRIVE 8GB capacity, USB Hi-Speed interface
PART CODE SDCZ8-8192-E75
FULL REVIEW May 2008

Large files **22.2MB/s**
Small files **3.8MB/s**

-50% Reference +50% +100%

CORSAIR Flash Voyager 4GB

★★★★★

£20 inc VAT

From www.lambda-tek.com/componentshop

COMPUTER SHOPPER
BUDGET BUY

The Voyager is one of the cheapest 4GB flash drives we've reviewed. It costs a reasonable £4.81 per gigabyte. The outer casing is made of rubber and should absorb any bumps or shocks. Unfortunately, there's nowhere to stow the rubber cap when detached, which means it's easy to lose.

The Voyager performed very well in our photo files test, and it delivered respectable speeds in all others. It's a great choice if you need something durable and inexpensive.



USB FLASH DRIVE 8GB capacity, USB Hi-Speed interface
PART CODE CMFUSB2.0-4GB
FULL REVIEW May 2008

Large files **18.9MB/s**
Small files **2.3MB/s**

-50% Reference +50% +100%

PIONEER BDR-202

★★★★

£203 inc VAT

From <http://uk.insight.com>

There was never a real contest between HD DVD and Blu-ray for data storage. Very few HD-DVD writers were ever released, and Blu-ray discs can hold more data than HD DVD discs. The BDR-202 is Pioneer's latest Blu-ray writer, but it supports only single-layer 25GB discs and not double-layer 50GB discs. Fortunately, it's also available in black, with a part code of BDR-202 BK.

The BDR-202 was quick at burning rewritable Blu-ray discs, taking only 44 minutes and 41 seconds. It took 24 minutes and 50 seconds to burn a write-once Blu-ray disc. That's quick, but LG's GGW-H20L drive (reviewed in *What's New, Shopper* 243) was even quicker, taking just under 22 minutes.

We had no trouble watching a Blu-ray movie on the BDR-202, although no Blu-ray playback software

is included. This is an added expense if you don't already own a copy; PowerDVD 7.3 Ultra costs around £60 online.

We were also disappointed with the BDR-202's speeds when writing DVDs. Although it came close to its claimed 4X for burning dual-layer DVDs, it couldn't match Pioneer's claim of 12X for writing single-layer DVD; it managed only around 7.5X. LG's GGW-H20L fared similarly when filling dual-layer discs, but was quicker at burning single-layer DVDs, reaching 9X.

The BDR-202 is a reasonable choice if you need to regularly re-use rewritable Blu-ray discs, but LG's GGW-H20L is the faster Blu-ray burner overall. Despite coming with bundled software the GGW-H20L is £32 cheaper, making it the better deal.

Alan Lu



SUMMARY

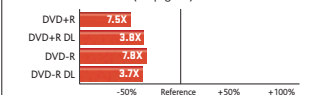
- ✓ Fast at writing BD-RE discs
- ✗ Disappointing DVD writing
- ✗ Expensive

BLU-RAY WRITER 4X BD-R, 2X BD-RE, 12X DVD-R, 12X DVD+R, 6X DVD-RW, 6X DVD+RW, 4X DVD-R DL, 4X DVD+R DL, 5X DVD-RAM

PART CODE BDR-202

DETAILS www.pioneer.co.uk

PERFORMANCE (see page 66)



RAIDSONIC IcyBox IB-361StUS-B-BL

★★★★

£35 inc VAT

From www.scan.co.uk

RaidSonic's IcyBox enclosure allows you to connect a 3½in SATA/300 hard disk to a USB or eSATA port. The black metal design and pulsating blue activity light looks sleek. The light can be turned off if it's too distracting. If your PC doesn't have an eSATA port, a handy SATA/300-to-eSATA bracket is included.



Fitting a disk is easy. The included plastic key unlocks the flip-down front door, allowing the disk to be slid into the empty bay. No screws are required, but you will need to keep the key somewhere safe.

The IcyBox's performance over USB was in line with what we would expect. It was also quick at copying small files over eSATA. However, it wasn't quite as fast at transferring large files as certain other enclosures that we've seen.

RaidSonic's IcyBox isn't a bad hard disk enclosure, but Enermax's Jazz (reviewed in *What's New, Shopper* 243) is even easier to assemble, and it also has faster eSATA performance.

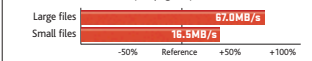
Alan Lu

SUMMARY

- ✓ Simple installation
- ✓ Quiet; eSATA bracket included
- ✗ Easy-to-lose key

3½IN SATA HARD DISK ENCLOSURE Takes one 3.5in SATA/150 or 300 hard disk, USB Hi-Speed, eSATA interface
PART CODE IB-361StUS-B-BL
DETAILS www.raidsonic.de/en

PERFORMANCE (see page 66)



WESTERN DIGITAL Scorpio 250GB

★★★★★

£70 inc VAT

From www.lambda-tek.com/componentshop

COMPUTER SHOPPER
BEST BUY

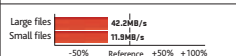
PRICE CUT!

Western Digital's Scorpio 250GB is the roomiest laptop disk yet, rivaling the capacity of some desktop disks. It is also one of the fastest 2½in hard disks we've seen. What's more, it didn't reduce the battery life of our laptop, unlike some other 2½in disks.

This is the best laptop hard disk we've seen. However, it won't fit older notebooks because it uses a SATA rather than a PATA connection.



2½in INTERNAL HARD DISK
250GB capacity, 232GB formatted capacity (NTFS),
SATA interface, 5,400rpm spindle speed
PART CODE 3384-5628
DETAILS www.westerndigital.com
FULL REVIEW Jan 2008



WESTERN DIGITAL Caviar SE16 500GB

★★★★★

£73 inc VAT

From www.lambda-tek.com/componentshop

COMPUTER SHOPPER
BEST BUY

Motherboard and hard disk manufacturers may be phasing out PATA in favour of SATA, but you can still buy PATA hard disks. Western Digital's 500GB internal PATA hard disk is our pick if your computer's motherboard doesn't have any SATA ports. It performed well in both our large and small files tests, and is good value at 16p per gigabyte.



PATA HARD DISK 500GB hard disk, 465GB formatted capacity (NTFS), PATA/100 interface, 7,200rpm spindle speed, 16MB cache, 10.9ms seek time, 29dB(A) noise when idle
PART CODE WD5000AAKB
DETAILS www.westerndigital.com
FULL REVIEW Apr 2008



HITACHI Deskstar 7K1000 HDS721075KLA330

★★★★★

£102 inc VAT

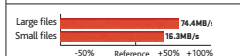
From www.ebuyer.com

COMPUTER SHOPPER
BEST BUY

Hitachi's 750GB Deskstar has a very low cost per gigabyte of just 15p. It was very fast in our small files tests and performed respectably in our large files tests. Unlike many SATA hard disks, it has both SATA and molex power connectors, so you shouldn't need converters. With its great performance and low price, this is one of the best 3½in hard disks around.



SATA HARD DISK 750GB hard disk, 698GB formatted capacity (NTFS), SATA/300 interface, 7,200rpm spindle speed, 32MB cache, 8.5ms seek time, 32dB(A) noise when idle
PART CODE HDS721075KLA330
FULL REVIEW Apr 2008



WESTERN DIGITAL Scorpio 320GB

★★★★★

£100 inc VAT

From www.lambda-tek.com/componentshop

Western Digital's Scorpio 320GB is one of the first SATA/300 laptop hard disks we've seen. Theoretically, it could be twice as fast as its SATA/150 predecessors, but 150MB/s is more than fast enough for today's disks, so the 300MB/s limit of the SATA/300 interface didn't lead to any speed improvements in our file-transfer tests. Still, this was one of the quickest 5,400rpm laptop hard disks we've ever tested.

We were also pleased to see that it didn't reduce the battery life of our laptop. In fact, our laptop lasted an extra 40 minutes in our light-use test when fitted with the Scorpio.

This is a fast and spacious laptop hard disk, but it costs 31p per gigabyte. The Scorpio 250GB (see 'Also consider...' on page 53) is almost as fast, but costs 28p per gigabyte. Toshiba's MK3252GSX (below) is slower still, but is 27p per gigabyte.

Alan Lu



SUMMARY

- ✓ Fast performance
- ✓ Can increase battery life
- ✗ Relatively expensive per GB

SATA HARD DISK 320GB hard disk, 298GB formatted capacity (NTFS), SATA/300 interface, 5,400rpm spindle speed, 8MB cache, 5.5ms seek time, 26dB(A) noise when idle

PART CODE WD3200BEVT

DETAILS www.westerndigital.com

PERFORMANCE (see page 66)

Large files	43.7MB/s	-50%	Reference	+50%	+100%
Small files	12.2MB/s				

TOSHIBA MK3252GSX

★★★★★

£86 inc VAT

From www.oyyy.co.uk

Like Western Digital's Scorpio above, Toshiba's MK3252GSX is a 320GB SATA/300 hard disk for laptops. Even if your laptop only supports SATA/150, you'll still be able to use a SATA/300 disk.

The MK3252GSX was almost as fast at reading large files as the Scorpio, and was actually faster when reading small files. Unfortunately, it was noticeably slower than the Scorpio when writing both large and small files. Although disappointing, it was still faster than most of the 5,400rpm SATA/150 laptop hard disks we've seen recently. Thankfully, the MK3252GSX didn't reduce the battery life of our laptop in our light usage test. Our laptop lasted 23 minutes longer with the MK3252GSX fitted, which isn't as lengthy as the Scorpio, but is still a good result.

Toshiba's MK3252GSX may not be as consistently fast as the Scorpio, but it's good value at just 27p per gigabyte.

Alan Lu



SUMMARY

- ✓ Quick at reading files; low cost per GB
- ✓ Can increase battery life
- ✗ Disappointing writing performance

SATA HARD DISK 320GB hard disk, 298GB formatted capacity (NTFS), SATA/300 interface, 5,400rpm spindle speed, 8MB cache, 12.0ms seek time, noise when idle not disclosed

PART CODE MK3252GSX

DETAILS <http://sdd.toshiba.com>

PERFORMANCE (see page 66)

Large files	38.8MB/s	-50%	Reference	+50%	+100%
Small files	10.5MB/s				

Also consider...

LG GSA-E50N

★★★★★

£50 inc VAT

From www.ebuyer.com

COMPUTER
SHOPPER
BEST BUY



LG's GSA-E50N portable DVD writer costs less than £50, but still looks sleek.

It performed well in all our tests. It can also password-protect discs using the included copy of Nero. Files are still visible in Windows Explorer, but can't be opened without a downloadable utility and your password.

EXTERNAL DVD WRITER 8X DVD-R, 8X DVD+R, 6X DVD-RW, 8X DVD+RW, 6X DVD-R DL, 6X DVD+R DL, 5X DVD-RAM, 24X CD-R, 24X CD-RW
PART CODE GSA-E50N
DETAILS <http://uk.lge.com>
FULL REVIEW Feb 2008

DVD+R	8.1X				
DVD+R DL	7.1X				
DVD-R	10.1X				
DVD-R DL	9.1X	-50%	Reference	+50%	+100%

LG GGW-H20L

★★★★★

£169 inc VAT

From www.lambda-tek.com/componentshop



LG's GGW-H20L can play both HD DVD and Blu-ray discs, so it is ideal for a media centre PC. It was fast at writing BD-R discs but not rewritables. If you don't need to burn to Blu-ray, opt for the GGC-H20L which is the same drive but costs just £96 including VAT – a huge bargain.

BLU-RAY WRITER/HD-DVD ROM DRIVE 6X BD-R, 2X BD-RE, 4X BD-R DL, 2X BD-RE DL, 16X DVD-R, 16X DVD+R, 6X DVD-RW, 8X DVD+RW, 4X DVD-R DL, 4X DVD+R DL, 5X DVD-RAM
PART CODE GGW-H20L
FULL REVIEW May 2008

DVD+R	8.1X				
DVD+R DL	7.1X				
DVD-R	10.1X				
DVD-R DL	9.1X	-50%	Reference	+50%	+100%

CHOOSING A... NAS Device

Follow the steps to find your ideal specs

CAPACITY: 250GB

INTERFACE: 100/1,000Mbit/s Ethernet

Recommended minimum in grey

1 A basic network-attached storage (NAS) device with the specifications above will cost around £100. It has only a single hard disk, so you'll need to make backups to protect your data, and you can't upgrade its storage capacity.

Its Gigabit Ethernet interface means that it transfers data quickly, although to use it at this speed you'll need computers with Gigabit Ethernet network adaptors and a Gigabit Ethernet switch or router. Computers with 10/100 adaptors will still be able to access the NAS device, but at just 100Mbit/s.

2 The amount of network storage you need depends on the types of files you use. If you want to store Word and Excel documents, for example, a 250GB device will be more than enough. If you intend to hoard DVD-quality video, on the other hand, you'll need much more. A single uncompressed DVD image can represent up to 8.5GB of data so even a modest media collection will require around 500GB of storage space.

3 If you can see no end to your storage needs, consider buying an upgradable NAS device. Many have a USB port so you can add a second, external disk.

Devices such as Synology's barebones NAS kits with spare disk trays allow for cheaper and faster upgrades in the future.

4 If you want extra protection for your data, look for a device that supports RAID. A RAID 1 or RAID 5 array reduces the available capacity, but if one disk fails then your data remains safe.

5 If you need access to your files while you're away from home or the office, look for a NAS with an FTP server. Some NAS devices can share a USB printer across your networks saving you the expense of a buying an Ethernet printer. A NAS device with a Universal Plug and Play (UPnP) media server can stream your music, photos and videos to a network media player, so you can enjoy your media collection in another room.